ing, New York, the Nonsol Glass manufactured by Whitall, Tatum & Company at Milville, New Jersey, the especially fine physical control of the Kimble Glass Company at Vineland, New Jersey, and the production of fine special apparatus by Eimer & Amend of New York City—all show what can be done in this country in an emergency. If these conditions continue to be fostered we may in time lead the world in the production of scientific things. Certainly interest in this subject is growing and a movement is now on foot to interest manufacturers, jobbers and buyers in the possible publication of a journal devoted to chemical apparatus.

Undoubtedly the time will come, however, when some qualifying clause should be embodied in the tariff laws by which the defects of the proposed high protective tariff laws will be overcome, in order to assist especially qualified men to procure from abroad articles of great scientific merit though of little commercial value, which of necessity must be produced by the genius who devised the apparatus or prepared the compound. Probably this clause would necessarily be administered by some committee of scientists appointed by the government. Whether these defects to the proposed law are to be remedied by allowing certain things to come in duty-free as indicated, or by a system of bonuses to scientific institutions or members using material, is a debatable question.

To sum up the whole matter, it would seem to the authors that a method should be devised whereby all essential scientific material should be manufactured by the nation and while a general protective duty will probably be secured from Congress, it is our opinion that care should be taken that no obstacle be put in the way of the scientist doing constructive research.

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SCIENTIFIC EVENTS

THE USE OF REINFORCED CONCRETE IN SHIPBUILDING

REINFORCED concrete was first used in making a boat in France in 1849, but its use languished from 1849 until 1887 when a small concrete boat was built in Holland. This boat was first used by duck shooters on account of its high stability, and in 1918 it was still in use by a cement-products company in Amsterdam. Italy, Germany and England next fell in line, and a revival of concrete boat construction in France took place in 1916. Concrete boats were constructed also in New South Wales, Canada, China and Spain. After the outbreak of the war, as her ships were destroyed by submarines, Norway lost no time in building concrete ships. At the Fougner plant, at Moss, the Nannsiffiord, a 200-ton concrete cargo vessel was built and, after a successful trial trip, engaged in traffic between Norway and England and along the Norwegian coast. This was practically the pioneer seagoing self-propelled concrete ship.

In 1918 the construction of two fleets of concrete barges, each barge measuring 20 by 130 feet and of 550 tons capacity, was begun at New Orleans, La., and at Seattle, Wash. In 1918 the *Faith,* a concrete self-propelled merchant vessel of 5,000 tons dead-weight capacity, was launched at San Francisco, Cal.

In the stress to supply new ships reinforced concrete was adopted as a building material mainly for the following reasons: First, the concrete materials required are easily obtained, and the steel needed is employed in a form and quantity which make no strain on the rolling mills; second, the labor is less skilled and is recruited from a class totally different from the ordinary shipyard labor, so that the work does not increase the stress on the existing shipyards; third, a concrete ship costs no more than a steel ship and requires less expenditure for its upkeep; fourth, the time of construction is shorter.

When these facts are coupled with three considerations which make reinforced concrete most valuable for shipbuilding there seem to

be abundant reasons for its present larger use for that purpose. These considerations are: First, the concrete ship can be made practically waterproof; second, the reinforcement can be completely inclosed by the concrete so as to prevent rusting; third, concrete and reinforced concrete are absolutely fireproof.

Concrete used as construction material improves with age; there is no definite knowledge to-day as to the limits of its durability in time. It is not known to be attacked by insects; mould, vermin and bacteria find no soil for growth in it, and consequently ferroconcrete vessels can easily be kept clean. The ease of repairing a concrete ship by the simple application of new concrete is also a distinct advantage.

A chapter of "Mineral Resources of the United States" on cement in 1917, published by the United States Geological Survey, Department of the Interior, includes a section on concrete ships, by Robert W. Lesley, associate of the American Society of Civil Engineers, one of the pioneer manufacturers of Portland cement and a member of the committee on concrete ships of the American Concrete Institute. Mr. Lesley gives a full account of the ship *Faith*, the investigations of the American Concrete Institute, government construction, and patents for concrete ships, also a bibliography of concrete in shipbuilding.

In carrying out its emergency shipbuilding program the government made contracts for a large number of concrete ships. After the armistice the general program was changed; the total output of steel, wood and concrete ships was curtailed, but the infant concrete shipbuilding industry will probably continue to grow, for it still affords great opportunities for research and development.

EDUCATION AND SCIENCE IN THE BRITISH CIVIL SERVICE ESTIMATES

The estimates for civil services for the year ending March 31, 1920, as quoted in *Nature*, amounted in Class IV. (Education, Science and Art), to £41,251,610. The following are among the estimates:

United Kingdom and England

Service	Compared with 1918–19	1919–20 £
Board of Education	31,353,111	12,243,406
British Museum	209,714	83,572
Scientific investigation, etc.	113,974	59,733
Department of Scientific and Industrial Research	242,815	94,465
Universities and Colleges, United Kingdom, and Intermediate Education, Wales	945,700	624,000
Universities, etc., special grants	500,000	470,000
Scotland		
Public education	4,677,220	1,635,675
Ireland		
Public education	2,721,356	519,752
Intermediate education	90,000	—
Science and art	190,498	27,105
		Decrease
Universities and colleges	85,000	11,350

Details of some of these estimates of particular interest to men of science are as follows:

SCIENTIFIC INVESTIGATIONS, ETC.

	£
Royal Society:	
(i) Grant in aid of (*a*) scientific investigations undertaken with the sanction of a committee appointed for the purpose (£4,000) and (*b*) scientific publications (£1,000)	5,000
(ii) Grant in aid of salaries and other expenses of the Magnetic Observatory at Eskdalemuir	1,000
Meteorological Office	47,000
Royal Geographical Society	1,250
Marine Biological Association of the United Kingdom	1,000
Royal Society of Edinburgh	600
Scottish Meteorological Society	100
Royal Irish Academy	1,600
Royal Zoological Society of Ireland	500
British School at Athens	500
British School at Rome	500
Royal Scottish Geographical Society	200
National Library of Wales	8,900
National Museum of Wales:	
Grant in aid of the expenses of the museum	4,000
Special building grant in aid	20,000
Solar Physics Observatory	3,000
School of Oriental Studies	4,000